Space Weather Forecast

Issued on Friday, 25 August 2023 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of isolated M-flares throughout (R1-R2 Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with the largest event a solitary low-level Moderate flare at 25/01019 UTC from a medium sized sunspot in the southeast. There are a total of six sunspot regions on the disc. The most complex region is the one responsible for the Moderate class flare. It contains two opposite polarity areas within the same individual spot and poses the greatest risk for further significant flares at this time. The largest spot on the visible disc resides in the northeast. It contains a large lead spot to the south of a much smaller trailer spot, with an uncommon east-west aligned neutral polarity line suggesting potential instability. A spot in the far northwest continues to see some minor proliferation of opposite polarity spots with isolated low-level Common-class flare activity. The other spots were also smaller, simple spots, including a new region recently rotated over the southeast horizon.

No definitive Earth-directed CMEs (coronal mass ejections) have been observed, although a couple of potential candidates are still to be assessed. A Common-class flare at 25/2214 UTC from a region in the northwest resulted in a faint CME in available solar imagery, although much if not all of the material appears directed west of Earth. A CME was observed from the previous a weaker common class flare however, but this was from over the northwest limb. Another CME was detected resulting from the Moderate flare in the southeast earlier in the UTC day, though this appears to be mainly, or exclusively to the east of Earth's position.

Solar Wind / Geomagnetic Activity: A transition into the fast wind of from a coronal hole was observed during the first half of the period, followed by the gradual transition out of the same fast wind in the second half of the period. Solar wind speeds increased from 360-400 km/s (background) to become more persistently slightly elevated from around 24/1500 UTC. Briefly elevated speeds were observed with a peak of 520km/s at 24/1841 UTC, but remained more generally 440-500km/s for a period, before declining from around 24/2300 UTC, easing to 380-400km/s (background to slightly elevated) by the middle of the UTC day on 25 Aug. The interplanetary magnetic field (IMF) was mainly weak but briefly rose to Moderate around 24/1600 UTC, before declining to persist at weak levels from 24/1630 UTC. The north-south component was mainly southward with only brief periods of northward direction. Resultant Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar Activity is expected to be generally Low, but with a chance of isolated Moderate class flares; this most likely from the complex sunspot in the southeast.

Solar Wind / Geomagnetic Activity: No definitive Earth-directed CMEs have been observed, although a couple of potential candidates are still to be assessed. Ongoing, but weakening fast

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wind influence at first with winds around 380-400km/s. This continuing to ease day 1 and 2 (25-26 Aug) with a further enhancement then possible from further coronal holes either late day 2 or day 3 (26-27 Aug). Quiet with isolated Unsettled intervals at first. The arrival of further faster winds late day 2 or day 3 (26-27 Aug) is then likely to increase activity to Unsettled with Active intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background with no solar radiation storms expected.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	5	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	35	35	35	35
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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